


Mobile terminal and its hinge device

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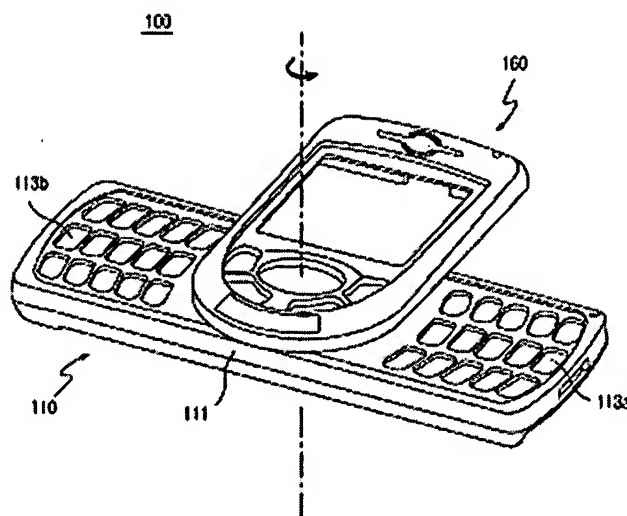
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The invention relates to a mobile terminal and hinge device thereof. The mobile terminal comprises: a first keypad disposed with a plurality of keys in the upper face of the main body at one side from a central portion so that the keys can be exposed; a second keypad disposed with a plurality of keys in the upper face of the main body at the other side from the central portion so that the keys can be exposed; and a planar area disposed in the central portion of the upper face of the main body to which the sub-body is rotatably connected, whereby one of the first and second keypads is opened and closed according to rotation of the sub-body. The mobile terminal introduces a novel concept including design by coupling the sub-body to the main body in a manner horizontally rotatable with respect to the upper face of the main body to open/close the keypad at least at one side of the main body. Furthermore, the keypads at both sides can be used together when the sub-body is rotated perpendicular to the main body, allowing more rapid input of information via both keypads and without any additional input device.



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Mobile terminal and its hinge device

Description of corresponding document: **US2004203517**

PRIORITY

[0001] This application claims priority to an application entitled "Mobile Terminal and Hinge Device Thereof" filed in the Korean Intellectual Property Office on Jul. 23, 2002 and assigned Serial No. 2002-43417, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a mobile terminal, and more particularly, to a mobile terminal having a sub-body rotatable horizontally with respect to a main body, and a hinge device of the mobile terminal.

[0004] 2. Description of the Related Art

[0005] As well known in the art, mobile terminals can be divided into bar, flip and folder type terminals according to their outward appearances.

[0006] The bar type terminal has data input/output (I/O) means and transmitting/receiving modules in one body housing. In the bar type terminal, a keypad functioning as data input means is constantly exposed, which increases the potential for malfunction. Further, downsizing thereof is restricted since a predetermined distance is required between transmitting and receiving units.

[0007] The flip type terminal comprises a body, a flip and hinge means for connecting the flip to the body. The body has data input/output means and transmitting/receiving modules, and the flip covers a keypad, which functions as the data input means, and prevents malfunction. However, downsizing is also restricted in the flip type terminal since a predetermined distance is required between transmitting and receiving units.

[0008] The folder type terminal comprises a body, a folder and hinge means for rotatably connecting the folder to the body so that the folder is rotated to open the folder type terminal. The body has a keypad and a transmitting unit functioning as data input means, and the folder has a display unit and a receiving unit functioning as data output means. The folder closely contacts the body in the standby mode to prevent malfunction, and is unfolded in the conversation mode to ensure sufficient distance between transmitting and receiving units, thereby imparting an advantage of downsizing the folder type terminal.

[0009] However, the conventional mobile terminals are restricted to the foregoing bar, flip and folder type terminals. Even recently introduced sliding type terminals fail to satisfy various desires of consumers about terminal designs. Moreover, input means of the mobile terminals are mostly restricted to keypads, which continue to fail to keep up with mobile communication services as they gradually diversify.

SUMMARY OF THE INVENTION

[0010] The present invention solves the foregoing problems and provides a mobile terminal and hinge device thereof which comprises a sub-body coupled to a main body in a manner horizontally rotatable with respect to an upper face thereof.

[0011] It is another object of the invention to provide a mobile terminal which comprises a sub-body coupled to a central portion of an upper face of a main body and keypads disposed on both sides of the central portion of the upper face of the main body for functioning as input means so that one of the keypads is opened/closed by rotation of the sub-body.

[0012] According to an aspect of the invention, there is provided a mobile terminal comprising: a main body; a sub-body coupled to the main body in a slidably rotatable manner relative to an upper face of the main body; a first keypad disposed with a plurality of keys in the upper face of the main body at one side of the central portion; a second keypad disposed with a plurality of keys in the upper face of the main body at the other side of the central portion; and a planar area disposed in the central portion of the upper face of the main body to which the sub-body is rotatably connected, whereby one of the first and second keypads is opened and closed according to rotation of the sub-body.

[0013] According to another aspect of the invention, there is provided a hinge device in a mobile terminal which includes a main body and a sub-body coupled to the main body in a slidably rotatable manner relative to an upper face of the main body, the hinge device comprising: a first through-hole disposed in an upper housing of the main body; a second through-hole disposed in one side of a lower housing of the sub-body, the second through-hole communicating with the first through-hole in the upper housing of the main body; a first hinge base having a central hinge hole and coupled inside the main body for externally

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exposing the hinge hole through the first through-hole; a second hinge base rotatable with respect to the first hinge base and having a cylindrical hinge shaft extended from a central portion and opened at both ends, the second hinge base coupled inside the sub-body for projecting the end of the hinge shaft through the second through-hole; and a fastening groove disposed along a circumferential direction in an outer periphery on the end of the hinge shaft, wherein the fastening groove is arranged inside the main body through the hinge hole of the first hinge base and fastened with an E-ring for coupling the sub-body to the main body in a horizontally rotatable manner with respect to the upper face of the main body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0015] FIG. 1 is a perspective view of a mobile terminal according to a preferred embodiment of the invention;

[0016] FIG. 2 is a perspective view of the mobile terminal shown in FIG. 1 in which a sub-body is rotated;

[0017] FIG. 3 is an exploded perspective view of a hinge device of the mobile terminal shown in FIG. 1;

[0018] FIG. 4 is a perspective view of the second hinge base of the hinge device shown in FIG. 3;

[0019] FIG. 5 is a perspective view of a wave washer of the hinge device shown in FIG. 3;

[0020] FIG. 6 is a cross-sectional view of the hinge device shown in FIG. 3;

[0021] FIG. 7 is a perspective view of a main body of the mobile terminal shown in FIG. 1 with the sub-body removed;

[0022] FIG. 8 is a perspective view of a sub-body of the mobile terminal shown in FIG. 1;

[0023] FIG. 9 is a partially broken-away perspective view of the mobile terminal shown in FIG. 1; and

[0024] FIG. 10 is a perspective view of the interior of a main body of the mobile terminal shown in FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] The following detailed description presents the preferred embodiments of the invention in reference to the accompanying drawings, and omits well-known functions and constructions to avoid unnecessarily obscuring the description of the invention.

[0026] FIG. 1 is a perspective view of a mobile terminal 100 according to a preferred embodiment of the invention, and FIG. 2 is a perspective view of the mobile terminal 100 shown in FIG. 1 in which a sub-body 160 is rotated.

[0027] As shown in FIGS. 1 and 2, the mobile terminal according to the preferred embodiment of the invention comprises a main body 110 and the sub-body 160.

[0028] The main body 110 has first and second keypads 113a and 113b on the upper face and a transmitting unit 115 which is internally equipped with a microphone in a position corresponding to the first keypad 113a. The sub-body 160 is rotatably coupled to a central portion on the upper housing 111 of the main body 110, i.e. to a planar area between the first and second keypads 113a and 113b, for being rotated horizontally with respect to the upper face of the main body 110. The sub-body 160 has a display unit 163 in an upper portion thereof, a receiving unit 167 next to one side of the display unit 163 and a third keypad 165 having function keys at the other side of the display unit 163. The function keys may include conversation start/end buttons, menu buttons for evoking various functions, selection buttons and so on. In the meantime, if the third keypad 165 is not installed, a further expanded size of display unit 163 can be provided.

[0029] In this embodiment, the first keypad 113a is constantly exposed regardless of rotation of the sub-body 160. This helps the mobile terminal be used equivalent to a conventional bar or flip type terminal when the sub-body 160 is not rotated, as shown in FIG. 1.

[0030] The second keypad 113b is opened/closed according to rotation of the sub-body 160. That is to say, the second keypad 113b is closed when the sub-body 160 is rotated to a position parallel to the main body 110. When the sub-body 160 is rotated to a position perpendicular to the main body 110, the second keypad 113b is opened and thus is usable. Where the second keypad 113b is opened, a user can conveniently input various data and text messages using both of the first and second keypads 113a and 113b of the main body 110.

[0031] While the sub-body 160 is rotatable up to 90 degrees according to this embodiment, the sub-body 160 can be alternatively configured to rotate up to an angle exceeding 90 degrees. The first and second keypads 113a and 113b may be set to their own uses different with each other so that the mobile terminal 100 can be used for other various purposes according to the position of the sub-body 160.

[0032] FIG. 3 is an exploded perspective view of a hinge device 300 of the mobile terminal 100 shown in FIG. 1. As shown in FIG. 3, the hinge device 300 of the mobile terminal of the invention comprises the first hinge base 310, the second hinge base 320, a wave washer 330, a plurality of spring washers 393 and an E-ring 391.

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[0033] The first hinge base 310 has a central hinge hole 311 and protrusions 313 and 315 located opposite each other on one side of the hinge hole 311. The protrusion 313 functions as a friction protrusion for generating friction while the hinge device 300 is rotated, and the protrusion 315 functions as a stopper for restricting the rotation range of the second hinge base 320.

[0034] The second hinge base 320 has cylindrical hinge shaft 321 extended from a central portion. The second hinge base 320 also has a printed circuit holder 325 projected for a predetermined height from the other side thereof. The printed circuit holder 325 prevents play of a flexible printed circuit 399 (shown in FIG. 9) while the hinge device 300 is operated in the mobile terminal.

[0035] Referring to FIG. 4, the hinge shaft 321 has a fastening groove 329 formed along a circumference of the outer periphery of the hinge shaft 321. The fastening groove 329 projects through the hinge hole 311 of the first hinge base 310 and the projecting portion is fastened with the E-ring 391. The hinge shaft 321 has slits 327 on both sides thereof and a guide holder 323 extended within the hinge shaft 321 at a predetermined distance from the inside wall.

[0036] Referring to FIGS. 9 and 10, the flexible printed circuit 399 is wound at least once within the hinge shaft 321 between the inside wall of the hinge shaft 321 and the guide holder 323.

[0037] The plurality of spring washers 393 are coupled with the wave washer 330 on the outer periphery of the hinge shaft 321. Therefore, the spring washers 393 and the wave washer 330 are placed between the first hinge base 310 and the second hinge base 320.

[0038] The spring washers 393 are bent to have elasticity, and are coupled to the hinge shaft 321 to exert an elastic force toward the end of the hinge shaft 321 in a longitudinal direction.

[0039] The wave washer 330 has a curved bend 331 in one side, as shown in FIG. 5, to impart friction against the friction protrusion 313 of the first hinge base 310. The wave washer 330 also has a guide groove 333 corresponding to the stopper protrusion 315 of the first hinge base 310 in a proper range of the outer periphery of the wave washer 330. The range of moving the stopper protrusion 315 is restricted by the guide groove 333, and the stopper protrusion 315 is configured to be rotatable in the range of 90 degrees according to this embodiment. Further, the wave washer 330 has protrusions 335 formed in the inner periphery and corresponding to the slits 327 in the hinge shaft 321 so that the wave washer 330 rotates together with the second hinge shaft 320.

[0040] FIG. 6 is a cross-sectional view of the hinge device 300. In FIG. 6, it can be understood that the end of the hinge shaft 321 is extended through the hinge hole 311 of the first hinge base 310 and the E-ring 391 is fastened to the fastening groove 329 so as to couple the first hinge base 310 with the second hinge base 320. On the outer periphery of the hinge shaft 321, the plurality of spring washers 393 are coupled with the wave washer 330.

[0041] In the meantime, the first hinge base 310 has a printed circuit holder 317, as the second hinge base 320 has the printed circuit holder 325. The printed circuit holder 317 of the first hinge base 310 is also provided to prevent play of the flexible printed circuit when the second hinge base 320 is rotated.

[0042] FIG. 7 is a perspective view of the main body 110 of the mobile terminal 100 shown in FIG. 1 with the sub-body 160 removed. As shown in FIG. 7, the main body 110 has the first through-hole 121 in an upper central portion thereof and a semi-circular sliding groove 123 adjacent to the first through-hole 121. Also as described above, the first and second keypads 113a and 113b are provided in the upper face of the main body 110 on both sides of the upper central portion.

[0043] FIG. 8 is perspective view of the sub-body 160 of the mobile terminal 100 viewed from the side of a lower housing 161 of the sub-body 160. The lower housing 161 of the sub-body 160 is provided in one side with a second through-hole 171 that communicates with the first through-hole 121 of the main body 110. In the lower end of the lower housing 161 of the sub-body 160, a sliding protrusion 173 is provided that corresponds to the sliding groove 123 in the upper face of the main body 110. The sliding protrusion 173 can reciprocate within the sliding groove 123, and the sliding groove 123 is so constructed that the sliding protrusion 173 can be rotated in the range of 180 degrees.

[0044] In order to restrict the rotation range of the sub-body 160, it can be so constructed to restrict the range of mutual rotation between a pair of grooves 125, which are adjacent to the first through-hole 121, and a pair of protrusions 175, which are adjacent to the second through-hole 171. That is, constructions of the sliding groove 123 and the sliding protrusion 173 and of the groove 125 adjacent to the first through hole 121 and the protrusions 175 adjacent to the second through hole 171 restrict the rotation range of the sub-body 160 to 90 degrees with respect to the main body 110.

[0045] While the sub-body 160 is rotatable in the range of 90 degrees in this embodiment, it is apparent that the sub-body 160 can be rotatable in the range of 180 or 270 degrees depending on the constructions of the sliding groove 123 and the sliding protrusion 173 and of the groove 125 and the protrusions 175.

[0046] FIG. 9 is a partially broken-away perspective view of the mobile terminal 100 shown in FIG. 1, and FIG. 10 is a perspective view of the interior of the main body 110 of the mobile terminal 100 shown in FIG. 1. As shown in FIGS. 9 and 10, the first hinge base 310 is installed on the first through-hole 121 in the upper housing 111 of the main body 110, and the second hinge base 320 is installed on the second

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through-hole 171 in the lower housing 161 of the sub-body 160. The first hinge base 310 is installed inside the main body 110, and the second hinge base 320 is installed inside the sub-body 160.

[0047] The hinge hole 311 of the first hinge base 310 is exposed through the first through-hole 121, and the hinge shaft 321 of the second hinge base 320 is arranged to protrude through the second through hole 171. Upon coupling the main body 110 to the sub-body 160, the end of the hinge shaft 321 projects through the second through-hole 171 and extends through the hinge hole 311 of the first hinge base 310 into the main body 110. Therefore, the E-ring 391 can be fastened to the fastening groove 329 in the end of the hinge shaft 321.

[0048] The E-ring 391 acts to mutually fasten the first and second hinge bases 310 and 320 which are respectively installed inside the main and sub-bodies 110 and 160, so that the sub-body 160 is coupled to the main body 110 in a manner horizontally rotatable with respect to the upper face of the main body 110.

[0049] Although not shown in the drawings, it is understood that the main body 110 and the sub-body 160 each have various electric circuits therein. That is, the main body 110 is equipped with a main board having circuitry for operation of the terminal, and the sub-body 160 is equipped with circuitry for operation of the display unit, a speaker device and the like. Therefore, the flexible printed circuit 399 is used for connecting the electric circuitry which are respectively installed in the main body 110 and the sub-body 160.

[0050] Referring to FIG. 10, the flexible printed circuit 399 extends from the main board (not shown) of the main body 110 and is fixed to the printed circuit holder 317 in the first hinge base 310. The flexible printed circuit 399 further extends up to the hinge shaft 321 of the second hinge base 320 and then is bent into the hinge shaft 321. The flexible printed circuit 399 is wound for at least one time within the hinge shaft 321, in particular, to pass between the guide holder 323 in the hinge shaft 321 and the inside wall of the hinge shaft 321. The flexible printed circuit 399 has this construction in order to ensure a sufficient length thereof so that tensile force owing to rotation of the sub-body 160 is not applied to the flexible printed circuit. Also the guide holder 323 is provided in order to prevent excessive play of the flexible printed circuit within the hinge shaft 321.

[0051] Referring to FIG. 9, after being wound within the hinge shaft 321, the flexible printed circuit 399 is re-bent into the sub-body 160 to be connected with the electric circuitry (not shown) in the sub-body 160. The flexible printed circuit 399 bent within the sub-body 160 is fixed to the printed circuit holder 325 of the second hinge base 320.

[0052] Even if the sub-body 160 is rotated, the play of the flexible printed circuit 399 is limited to the restricted range of the portion wound in the hinge shaft 321.

[0053] Resultantly, the hinge device of the mobile terminal of the invention also provides a manner for connection of the flexible printed circuit while maintaining rotatable coupling of the main body and the sub-body.

[0054] As set forth above, the mobile terminal of the invention provides a novel design of mobile terminal by means of installing the keypads separately in both sides of the main body and coupling the sub-body in the central portion of the main body in a manner horizontally rotatable to the upper face of the main body for opening/closing one of the keypads in the sides of the main body. Furthermore, the keypads at both sides can be used together when the sub-body is rotated to 90 degrees in respect to the main body so that a user can rapidly input information by a larger quantity with the keypads of the mobile terminal without any additional input device.

[0055] Although the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

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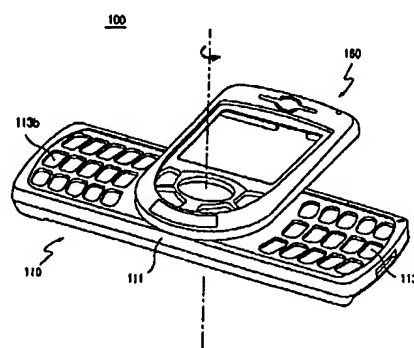
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权利要求书 3 页 说明书 9 页 附图 9 页

[54] 发明名称 移动终端及其铰链装置

[57] 摘要

本发明涉及一种移动终端及其铰链装置。该移动终端具有：有多个按键的第一小键盘，位于主机体中心部分一侧的上表面，以便能露出按键；有多个按键的第二小键盘，位于主机体中心部分另一侧的上表面，以便能露出按键；从属机体旋转连接到的位于主机体中心部分的平面区域；从而使第一和第二小键盘中的一个根据从属机体的旋转而打开和关闭。这种移动终端通过以相对于主机体的上表面水平旋转的方式将从属机体连接到主机体的中心部分以用于打开/关闭主机体至少一侧上的一个小键盘，而引入了移动终端的包括设计的新理念。此外，两侧的小键盘在从属机体旋转到垂直主机体时可以一起使用，从而可以迅速地通过这两个小键盘输入信息而不用附加任何输入装置。



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1. 一种移动终端，包括
主机体；
5 从属机体，相对于所述主机体的上表面以滑动可旋转方式连接到主机体；
第一小键盘，具有多个按键，在所述主机体的上表面上，位于主机体的所述上表面的中心部分的一侧；
第二小键盘，具有多个按键，在所述主机体的上表面上，位于中心部分的另外一侧；以及
10 在中心部分的平面区域，所述的从属机体可旋转地连接于此，
至此，所述第一和第二小键盘中的一个根据所述从属机体的旋转而打开和关闭。
- 15 2. 根据权利要求 1 所述的移动终端，其中所述从属机体相对于所述主机体在 0 到 90 度内旋转。
3. 根据权利要求 1 所述的移动终端，其中所述第一和第二小键盘之一无论从属机体是否转动，始终露在外面。
- 20 4. 根据权利要求 1 所述的移动终端，还包括：位于所述从属机体上表面的显示单元；和位于所述显示单元一侧的小键盘。
5. 一种包括主机体，以及相对于所述主机体的上表面以滑动可旋转方式连接到主机体的从属机体的移动终端中的铰链装置，该铰链装置包括：
25 第一通孔，位于所述主机体的上机壳中；
第二通孔，位于所述从属机体的下机壳的一侧中，所述第二通孔与所述第一通孔相通；
30 第一铰链基座，具有中心铰链孔，并连接到所述主机体内，以通

过所述第一通孔向外露出所述铰链孔；

第二铰链基座，可相对于所述第一铰链基座旋转，并具有从中心部分伸出的圆筒形铰链轴，所述第二铰链基座内连接于所述从属机体，以将所述铰链轴的端部伸过所述第二通孔；以及

5 5 紧固槽，沿圆周方向，位于所述铰链轴的端部的外圆周上；

至此，所述紧固槽通过第一铰链基座的所述铰链孔安置于所述主机体的内部，并紧固于 E 形环，以相对于主机体的上表面水平旋转的方式将从属机体连接到所述主机体。

10 6. 根据权利要求 5 所述的铰链装置，其中所述圆筒形铰链轴在其两端开口。

7. 根据权利要求 5 所述的铰链装置，还包括：

多个弹簧垫圈，用于向所述铰链轴的端部施加弹力；

15 波浪式垫圈，可与所述铰链轴一起转动，并具有弧形弯曲以示出在一个表面上的厚度差异，其中所述弹性垫圈与所述波浪式垫圈在第二铰链基座的所述铰链轴的外圆周上连接；以及

摩擦突缘，从所述第一铰链基座伸出，并接触到所述波浪式垫圈的弧形弯曲以产生摩擦力。

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8. 根据权利要求 7 所述的铰链装置，还包括：

导向槽，位于所述波浪式垫圈的外圆周上；以及

制动器，从所述第一铰链基座伸出，并对应于所述导向槽以在所述导向槽内移动。

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9. 根据权利要求 6 所述的铰链装置，还包括：

导向支架，与所述铰链轴的内壁有一定距离以具有预定的间隙，并在所述铰链轴内延伸；

印刷电路支架，分别位于所述第一和第二铰链基座的内表面上；

30 柔性印刷电路，用于允许在所述主机体和所述从属机体之间的电

连接，其中所述柔性印刷电路从所述主机体经所述第一铰链基座的印刷电路支架以弯曲的形式延伸到所述铰链轴内，在所述铰链轴内至少缠绕一次以从所述铰链轴的内壁和所述导向支架间穿过，并再次弯曲以经所述第二铰链基座的印刷电路支架延伸到所述从属机体。

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10. 根据权利要求 9 所述的铰链装置，其中所述柔性印刷电路由分别位于第一和第二铰链基座上的印刷电路支架固定。

11. 根据权利要求 5 所述的铰链装置，还包括：

10

滑动突缘，从所述的从属机体的下后部突出；以及

滑动槽，位于所述主机体的上表面，对应于根据所述从属机体的旋转形成的所述滑动突缘的旋转轨迹。

其中，所述滑动槽限定所述滑动突缘的旋转范围为 0 到 90 度。

15

12. 根据权利要求 5 所述的铰链装置，其中所述第一通孔位于所述主机体上表面的中心部分，其中所述主机体具有位于所述第一通孔两侧的小键盘，而且其中根据所述从属机体的旋转，所述小键盘中的一个被打开和关闭。

移动终端及其铰链装置

5 技术领域

本发明涉及移动终端，特别涉及，一种具有可相对于主机体水平旋转的从属机体的移动终端，以及这种移动终端的铰链装置。

背景技术

10 如本领域中所公知的，移动通信终端可以根据其外观分为条式、翻盖式和折叠式终端。

条式的终端在一个机壳里具有数据输入/输出（I/O）装置和发射/接收模块。在条式终端中，作为输入装置功能的小键盘始终暴露在外，
15 这增加了潜在的故障可能。此外，由于在发射和接收单元之间要求预定的距离，而使其小型化受到限制。

翻盖式终端包括机体、翻盖（flip）和将翻盖连接到机体的铰链装置。机体具有数据输入/输出装置和发射/接收模块，以及翻盖盖住的作为数据输入装置的小键盘，以避免故障。但是，由于在发射和接收单元之间要求预定的距离，也使其小型化受到限制。
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折叠式终端包括机体，折盖（folder）和用于旋转地将折盖连接到机体，以便折盖能够旋转地打开这种折叠式终端的铰链装置。机体具有小键盘和作为数据输入装置的发射单元，折盖具有显示装置和作为数据输出装置的接收单元。折盖和机体在待机状态下紧密连接在一起以防止故障，在通话模式下打开以保证在发射和接收单元之间具有充足的距离，因此在折叠式终端小型化上具有一定的优势。
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30 但是，现有技术中的移动终端限于前述的条式、翻盖式和折叠式

终端。即使最近引入的滑盖型终端也没有能够满足用户关于终端设计的各种要求。此外移动终端的输入装置更多地局限于小键盘，它仍旧没有能够跟上移动通信服务逐渐多样化的脚步。

5 发明内容

本发明解决了上述的问题并提供了一种具有铰链的移动终端，它具有相对于主机体的上表面以水平旋转方式铰接到主机体的从属机体。

10 本发明的另一目的是提供一种移动终端，它包括：连接到主机体的上表面中心部分的从属机体和作为输入装置的位于主机体的上表面中心部分两侧的小键盘，以便小键盘中的一个通过从属机体的转动而打开和关闭。

15 根据本发明的一个方面，提供了一种移动终端，包括：主机体；相对于主机体的上表面以滑动旋转方式连接到主机体的从属机体；位于主机体中心部分一侧的上表面上的具有多个按键的第一小键盘；位于主机体中心部分另一侧的上表面上的具有多个按键的第二小键盘；从属机体旋转连接到的位于主机体中心部分的平面区域，从而使第一
20 和第二小键盘中的一个根据从属机体的旋转而打开和关闭。

根据本发明的另一方面，在移动终端中提供一个铰链装置，该移动终端包括：主机体；和相对于主机体的上表面以滑动旋转方式连接到主机体的从属机体。铰链装置包括：位于主机体上机壳中的第一通孔；位于从属机体下机壳中的第二通孔；第二通孔与位于主机体上机壳中的第一通孔相通；第一铰链基座具有中心铰链孔并与主机体内部
25 连接，以通过第一通孔向外露出该铰链孔；第二铰链基座，可相对于第一铰链基座旋转，并具有从中心部位伸出的圆筒形铰链轴，并且两端打开，第二铰链基座连接于从属机体的内部，以通过第二通孔伸出
30 铰链轴的轴端；固定槽，位于沿着铰链轴端部圆周方向的外圆周上，

其中固定槽通过第一铰链基座的铰链孔放置在主机体的内部，并与 E 型环固定，以将从属机体相对于主机体的上表面以滑动旋转方式连接到主机体。

5 附图说明

本发明上述的目的、特点和优势将通过以下结合附图的详细说明而变的更加明了，其中：

- 图 1 示出了根据本发明的优选实施例的移动终端的透视图；
图 2 示出了图 1 所示的移动终端的透视图，其中从属机体被旋转；
10 图 3 示出了图 1 所示的移动终端的铰链装置的分解透视图；
图 4 示出了图 3 所示的铰链装置的第二铰链基座的透视图；
图 5 示出了图 3 所示的铰链装置的波浪式垫圈的透视图；
图 6 示出了图 3 所示的铰链装置的横截面图；
图 7 示出了图 1 所示的除去了从属机体的移动终端的主机体的透
15 视图；
图 8 示出了图 1 所示的移动终端的从属机体的透视图；
图 9 示出了图 1 所示的移动终端的部分断面透视图；
图 10 示出了图 1 所示的移动终端的主机体的内部的透视图。

20 具体实施方式

下面参照附图对本发明的优选实施例进行描述，在此，省略了对于公知的功能和结构的描述，以避免妨碍对于本发明的描述。

- 图 1 示出了根据本发明的实施例的移动终端 100 的透视图，图 2
25 示出了图 1 所示的移动终端 100 的透视图，其中从属机体 160 被旋转。
如图 1 和 2 所示，根据本发明的优选实施例的移动终端包括主机体 110
和从属机体 160。

- 主机体 110 具有位于上表面上的第一和第二小键盘 113a 和 113b，
30 以及发射单元 115，在它内部对应于第一小键盘 113a 的位置上装有麦

克风。从属机体 160 可旋转地连接于主机体 110 的上机壳 111 的中心部分，即连接到位于第一和第二小键盘 113a 和 113b 之间的平面区域，以相对于主机体 110 的上表面水平旋转。从属机体 160 在其上部具有显示单元 163，接收单元 167 与该显示单元 163 的一侧相邻，而显示单元 163 的另外一侧是具有功能键的第三小键盘 165。该功能键可以包括通话开始/结束按钮、用于启动各种功能的菜单按钮、选择按钮及其他按钮。同时，如果没有安装第三小键盘 165，则可以提供更大尺寸的显示单元 163。

在这一实施例中，第一小键盘 113a 始终露在外面，而与从属机体 160 的旋转无关。这使得当从属机体 160 如图 1 所示不转动时，移动终端可以等同于现有技术中的条式或翻盖式终端来使用。

第二小键盘根据从属机体 160 所旋转而打开/关闭。这就是说，第二小键盘 113b 在从属机体 160 旋转到平行于主机体 110 的位置时被关闭。当从属机体 160 旋转到与主机体 110 垂直的位置时，第二小键盘 113b 被打开并可使用。在第二小键盘 113b 被打开后，用户可以方便地使用主机体 110 的第一和第二小键盘 113a 和 113b 输入各种数据和文字信息。

根据本发明的这一实施例，从属机体 160 最多转到 90 度，作为选择，从属机体 160 可以被设定为转过超过 90 度的角度。第一和第二小键盘 113a 和 113b 可以自己设定彼此不同的用途，以便移动终端 100 能够根据从属机体 160 的位置而用于其他各种目的。

图 3 示出了图 1 所示的移动终端 100 的铰链装置 300 的分解透视图。如图 3 所示，本发明的移动终端的铰链装置 300 包括：第一铰链基座 310、第二铰链基座 320、波浪式垫圈 330、多个弹簧垫圈 393 和 E 形环 391。

第一铰链基座 310 具有中心铰链孔 311 和突缘 313 和 315，它们位于铰链孔 311 的一侧上，彼此相对。突缘 313 的功能是作为在铰链装置 300 旋转时产生摩擦力的摩擦突缘，而突缘 315 的功能是作为限制第二铰链基座 320 的旋转范围的制动器。

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第二铰链基座 320 具有从中心部分伸出的圆筒状的铰链轴 321。第二铰链基座 320 还具有从其另一侧突出预定高度的印刷电路支架 325。该印刷电路支架 325 用于在铰链装置 300 在移动终端中操作的同时保护柔性电路 399（在图 9 中示出）的运行。

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参照图 4，铰链轴 321 具有沿铰链轴 321 的外圆周表面形成的紧固槽 329。该紧固槽 329 通过第一铰链基座 310 的铰链孔 311 突出，而且突出的部分紧固于 E 形环 391。铰链轴 321 的两侧具有切口 327，而且导向孔 323 在铰链轴 321 内从内壁以预定的距离延伸。

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参照图 9 和 10，该柔性印刷电路 399 至少在铰链轴 321 内，在其内壁和导向孔 323 之间缠绕一次。

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在铰链轴 321 的外圆周上，多个弹簧垫圈 393 与波浪式垫圈 330 连接。因此，所述弹簧垫圈 393 和波浪式垫圈 330 放置在第一铰链基座 310 和第二铰链基座 320 之间。

弹簧垫圈 393 被弯曲以具有弹性，并连接到铰链轴 321 以在纵向上向铰链轴 321 的端部施加弹力。

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波浪式垫圈 330 在一侧具有弧形弯曲部分 331，如图 5 所示，以施加阻碍第一铰链基座 310 的摩擦突缘 313 的摩擦力。波浪式垫圈 330 在波浪式垫圈 330 的外圆周的适当范围内还具有对应于第一铰链基座 310 的制动器突缘 315 的导向槽 333。制动器突缘 315 的移动范围被导向槽 333 限定，而且制动器突缘 315 根据本实施例被设定为可在 90

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度范围内转动。此外，波浪式垫圈 330 具有形成在内圆周上并对应于铰链轴 321 中的切口 327 的突缘 335，以便波浪式垫圈 330 和第二铰链轴 320 一起转动。

5 图 6 示出了图 3 所示的铰链装置 300 的横截面图。参照图 6，可以理解，铰链轴 321 的端部延伸通过第一铰链基座 310 的铰链孔 311，而且 E 形环 391 紧固于紧固槽 329 以便将第一铰链基座 310 和第二铰链基座 320 连接在一起。在铰链轴 321 的外圆周表面上，多个弹簧垫圈 393 与波浪式垫圈 330 连接。

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同时，第一铰链基座 310 具有印刷电路支架 317，而第二铰链基座 320 具有印刷电路支架 325。该第一铰链基座 310 的印刷电路支架 317 还用于在第二铰链基座 320 转动时保护柔性电路的运行。

15 图 7 示出了图 1 所示的除去了从属机体 160 的移动终端 100 的主机体 110。如图 7 所示，主机体 110 具有在其上部中心部分的第一通孔 121，和邻近第一通孔 121 的半圆形滑动槽 123。如前所述，第一和第二小键盘 113a 和 113b 设置于主机体 110 的上表面中心部分的两侧。

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图 8 示出了从从属机体 160 的下机壳 161 一侧视去的图 1 所示的移动终端 100 的从属机体 160 的透视图，从属机体 160 的下机壳 161 的一侧具有和主机体 110 的第一通孔 121 相通的第二通过孔 171。在从属机体 160 的下机壳 161 的下端上，具有对应于主机体 110 上表面中的滑动槽 123 的滑动突缘 173。滑动突缘 173 能够在滑动槽 123 内
25 往复滑动，而且滑动槽 123 的结构使得滑动突缘 173 能够在 180 度范围内旋转。

30 为了限制从属机体 160 的转动范围，可以是这样的结构：以限制在邻近第一通孔 121 的一对槽 125 之间双向旋转的范围，以及在邻近

第二通孔 171 的一对突缘 175 之间的旋转范围。即，滑动槽 123、滑动突缘 173 和邻近第一通孔 121 的槽 125 以及邻近第二通孔 171 的突缘 175 的构造限制着从属机体 190 相对于主机体 110 的 90 度的旋转范围。

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在本实施例中，从属机体 160 在 90 度范围内转动的同时，很明显，从属机体 160 能够根据滑动槽 123、滑动突缘 173 和槽 125 以及突缘 175 的构造来旋转 180 度或 270 度的范围。

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图 9 示出了图 1 所示的移动终端 110 的部分断面透视图，图 10 示出了图 1 所示的移动终端 100 的主机体 110 的内部的透视图，如图 9 和 10 所示，第一铰链基座 310 装在主机体 110 的上机壳 111 中的第一通孔 121 中，第二铰链基座 320 装在从属机体 160 的下机壳 161 中的第二通孔 171 中。第一铰链基座 310 装在主机体 110 内，而第二铰链基座 320 装在从属机体 160 内。

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第一铰链基座 310 的铰链孔 311 通过第一通孔 121 露出，第二铰链基座 320 的铰链轴 321 安置在使其通过第二通孔 171 突出。当将主机体 110 连接到从属机体 160，铰链轴 321 通过第二通孔 171 突出并通过第一铰链基座 310 的铰链孔 311 延伸到主机体 110 内。因此，E-环 391 能够在铰链轴 321 的端部被紧固于紧固槽 329。

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E 形环 391 的作用为将分别装在主机体 110 和从属机体 160 中的第一、第二铰链基座 310 和 320 相互地紧固在一起，以便从属机体 160 相对于主机体 110 的上表面以水平旋转的方式连接到主机体 110。

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尽管图中未示出，但是可以理解，主机体 110 和从属机体 160 各自具有各种电路。即，主机体 110 装有具有用于操作终端的电路的主板，而从属机体 160 装有用于操作显示单元、扬声器装置及其他装置的电路。所以，柔性印刷电路 399 用于连接分别安装于主机体 110 和

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从属机体 160 中的电路。

参照图 10, 柔性印刷电路 399 从主机体 110 的主板 (未示出) 伸出, 并固定在第一铰链基座 310 中的印刷电路支架 317。该柔性印刷电路 399 进一步延伸到第二铰链基座 320 的铰链轴 321, 并随后弯曲到铰链轴 321 内。柔性印刷电路 399 至少在铰链轴 321 内缠绕一次, 特别是, 从铰链轴 321 中的导向支架 323 和铰链轴 321 的内壁之间穿过。该柔性印刷电路 399 具有这种结构是为了保证其足够的长度, 以便由于从属机体 160 的转动而产生的张力不会施加到该柔性电路。此外, 导向支架 323 的设置是为了避免柔性印刷电路在铰链轴 321 内的游间过量 (excessive play)。

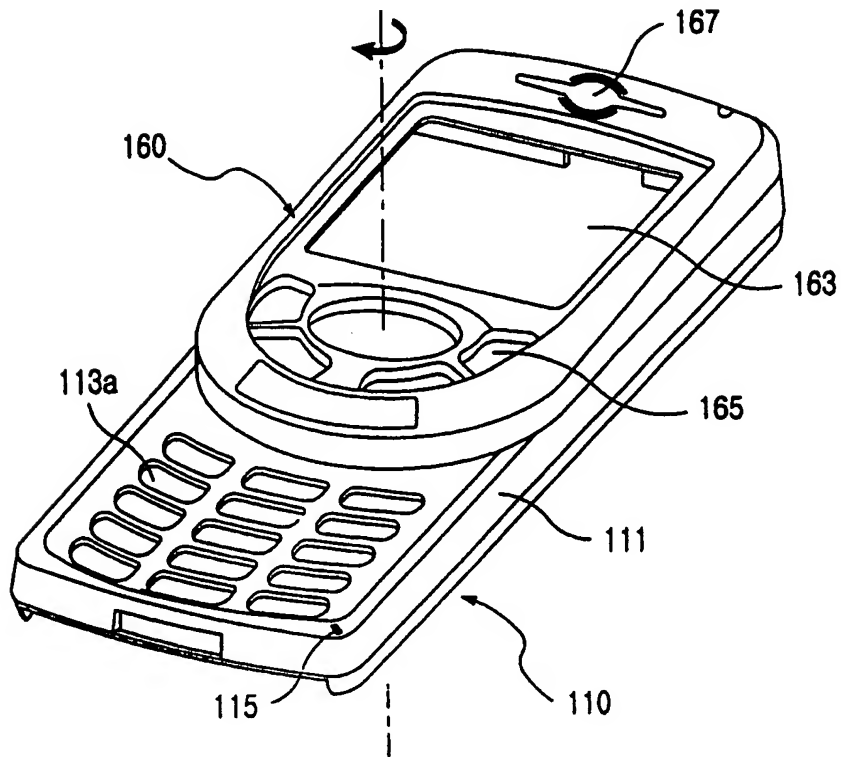
参照图 9, 当在铰链轴 321 内缠绕后, 该柔性电路 399 被再一次弯曲到从属机体 160 内, 以在从属机体 160 内和电路 (未示出) 连接。在从属机体 160 内被弯曲的柔性印刷电路 399 被固定于第二铰链基座 320 的印刷电路支架 325。

即使从属机体 160 转动, 柔性印刷电路 399 的运动被限定于在铰链轴 321 内缠绕的部分的被限定的范围。

结果是, 本发明的移动终端的铰链装置还提供了一种连接方式, 用于在保持主机体和从属机体的旋转连接的同时连接柔性印刷电路。

如上所述, 本发明的移动终端通过在主机体的两侧分别安装小键盘, 并以相对于主机体的上表面水平旋转的方式将从属机体连接到主机体的中心部分以用于打开/闭合主机体一侧上的一个小键盘而提供了移动终端的新设计。此外, 两侧的小键盘在从属机体相对于主机体旋转 90 度时可以同时使用, 以便用户可以迅速地通过移动终端的小键盘输入大量的信息, 而不用附加任何输入装置。

尽管参照本发明的优选实施例说明了本发明，本领域的普通技术人员可以理解，在不脱离本发明的权利要求所限定的精神和范围内，可以对本发明进行形式上和细节上的各种修改。

100**图1**

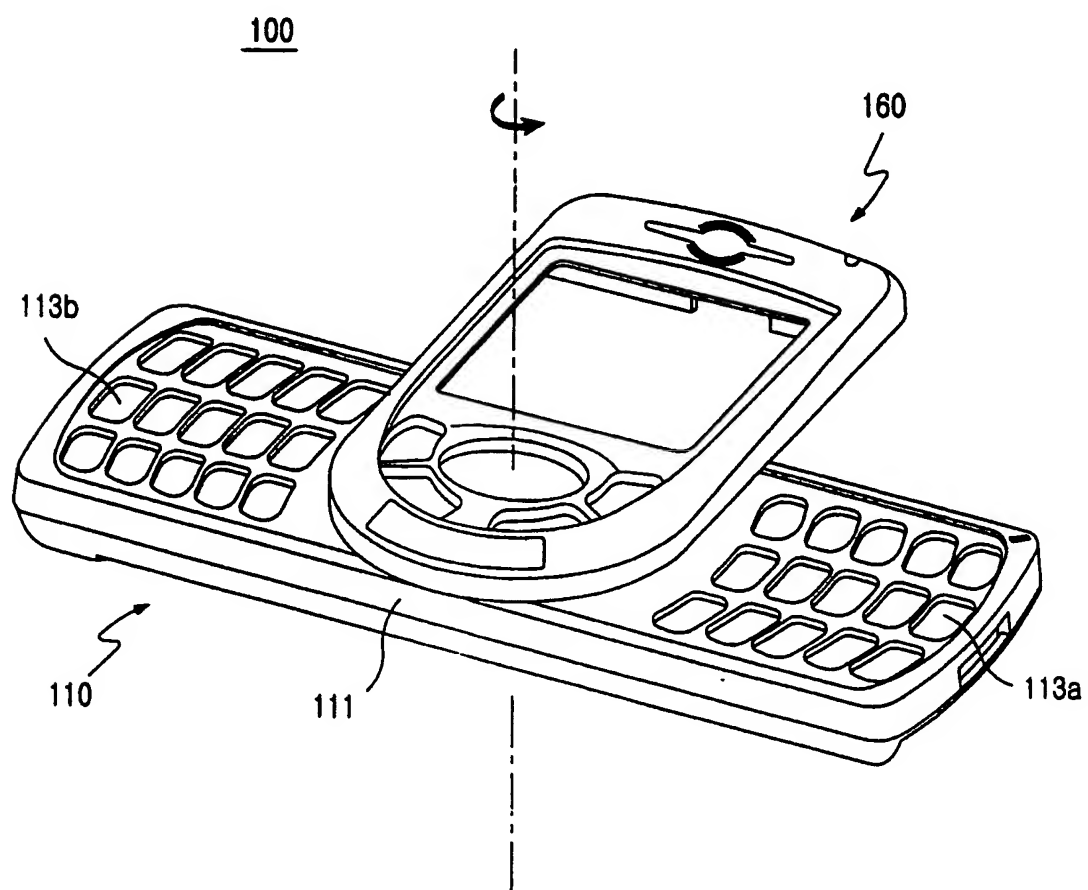


图2

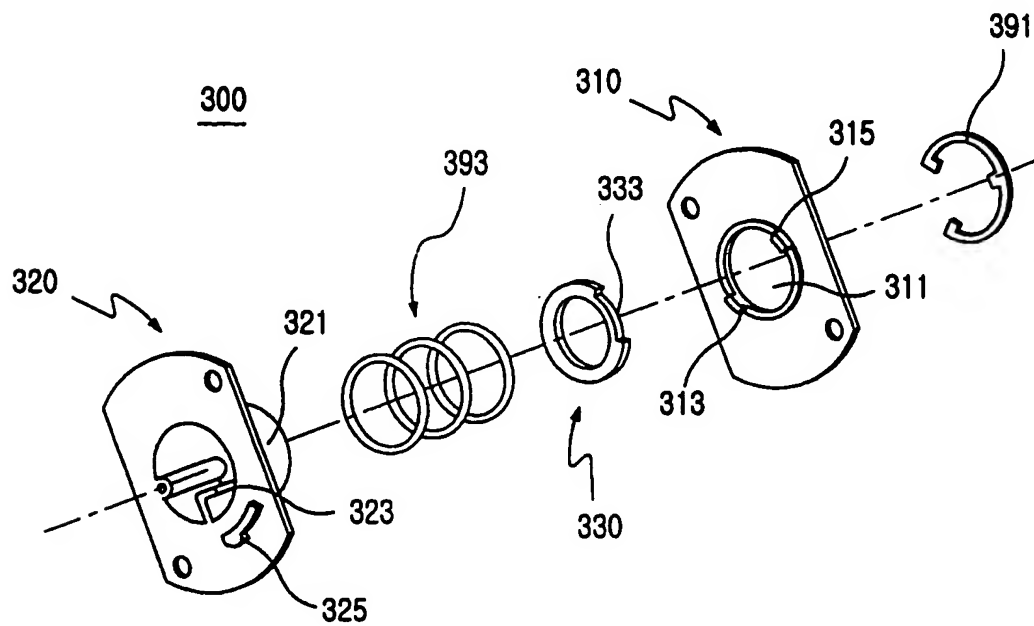


图3

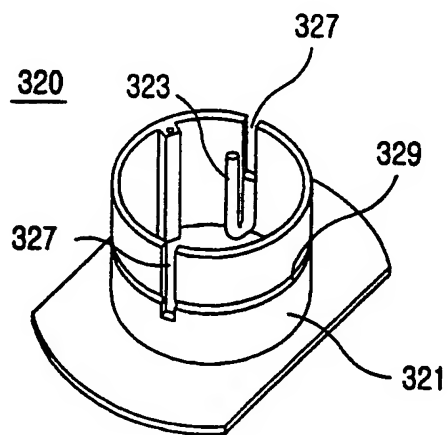


图4

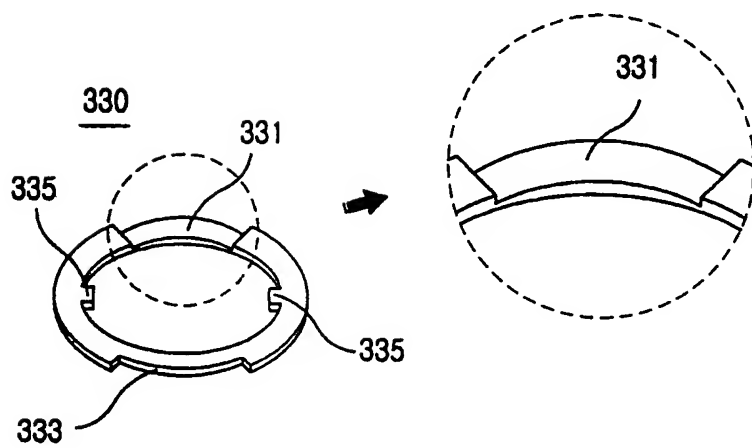
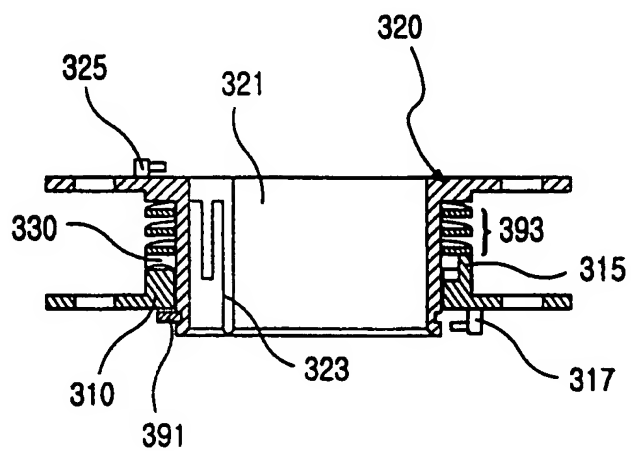
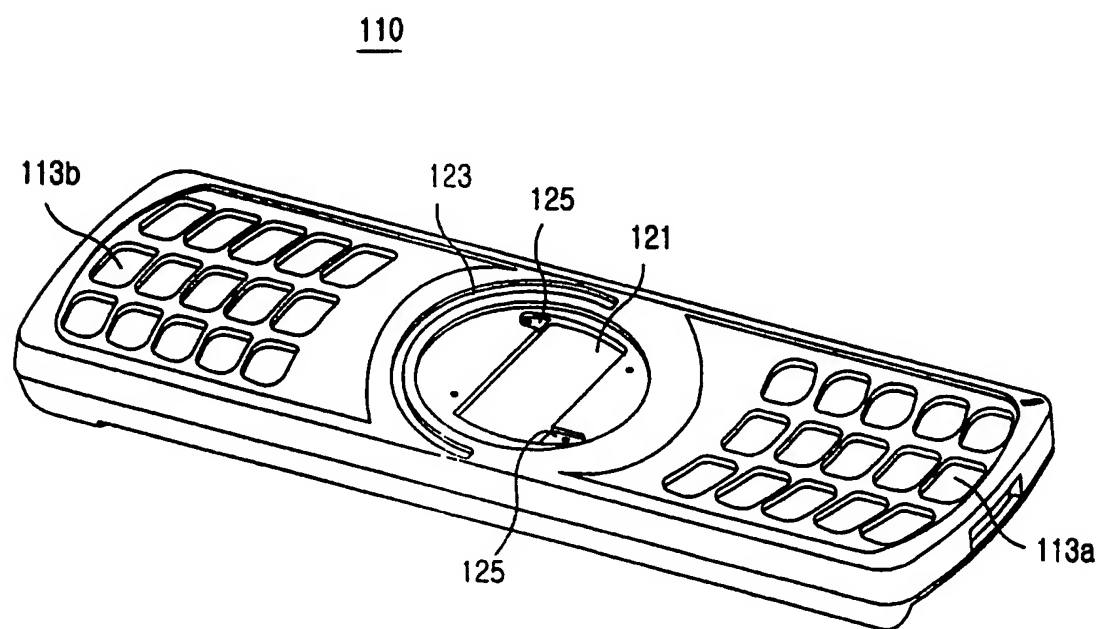
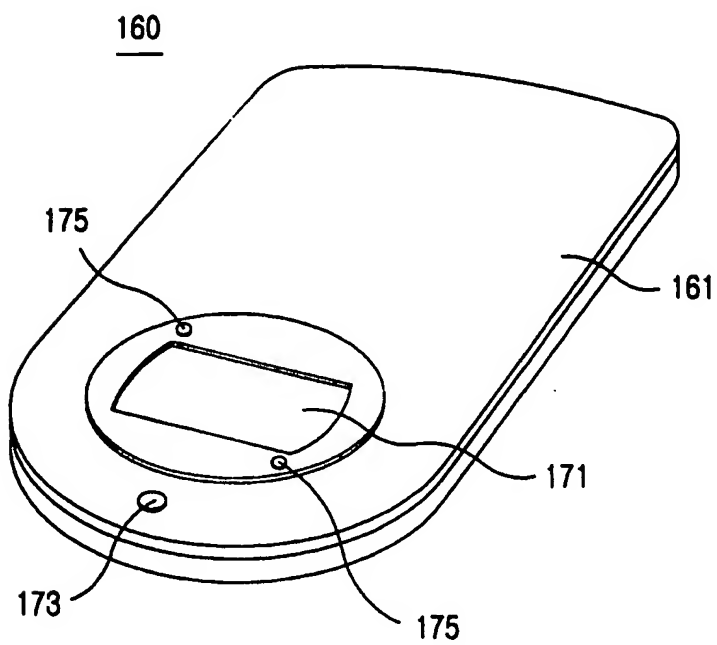
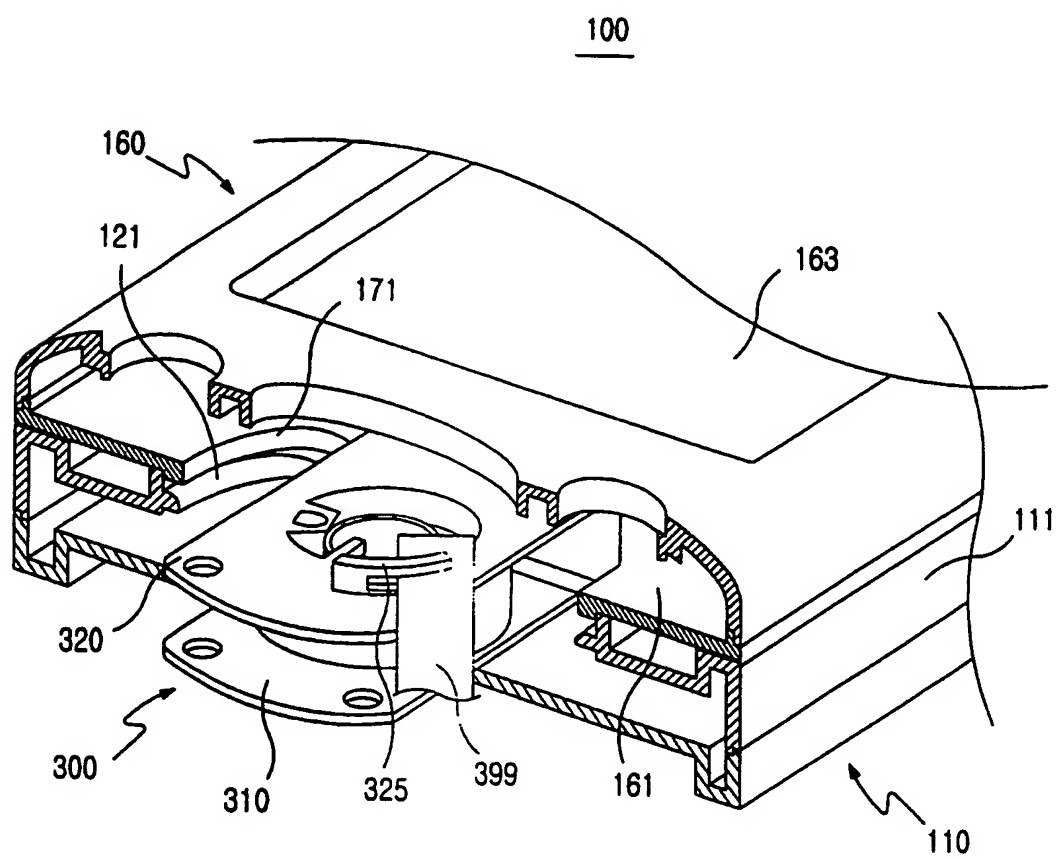


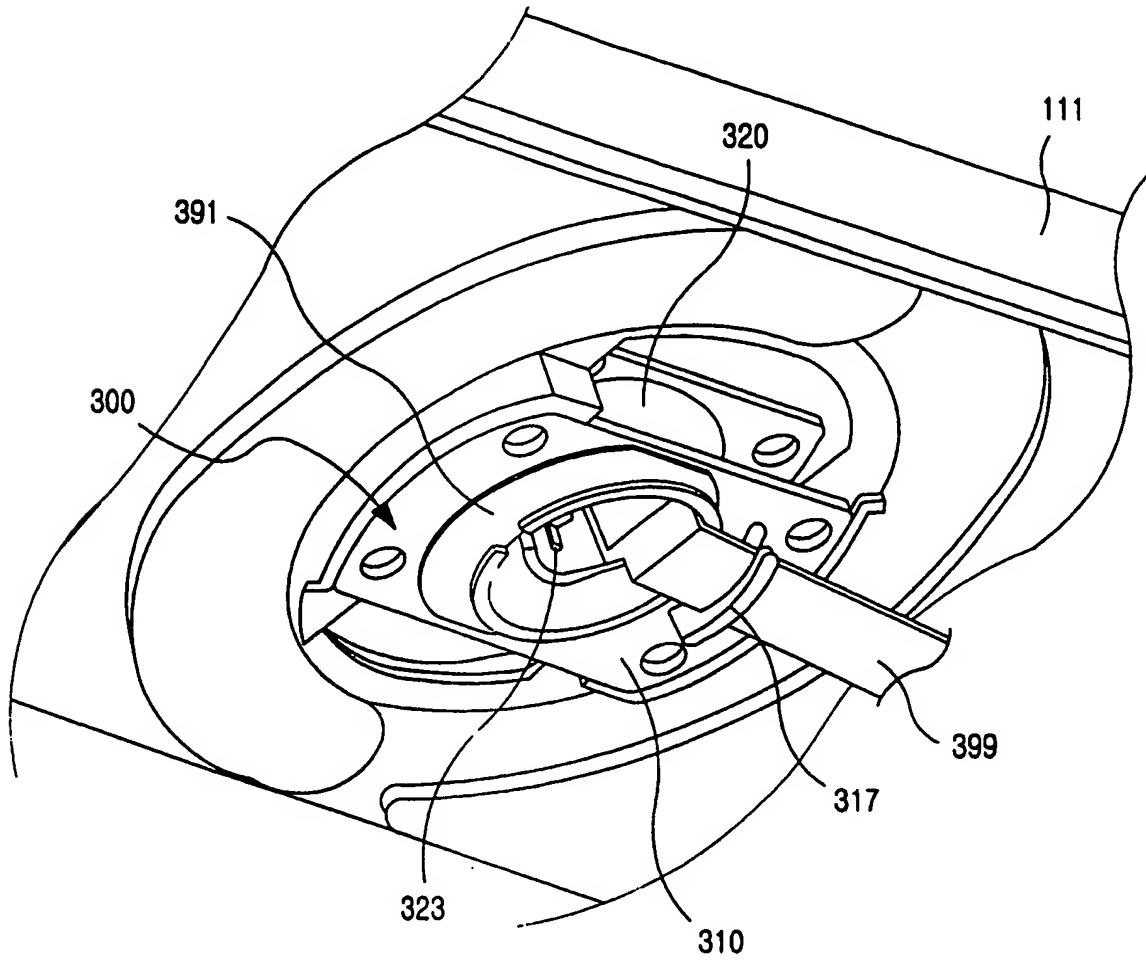
图5

300**图6**

**图7**

**图8**

**图9**

**图10**

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